



CIVIL AIM CONSULTANTS & ENGINEERS

(Building Geo-Tech & Highway Materials Testing Laboratory)



An ISO 9001-2015 Certified Company
NABL Accredited As Per ISO/IEC 17025:2017 Laboratory

Job No.: CACE /BBMP/RS/W.No.12/2022-23

Date : 02.11.2022

ATTERBERG LIMITS TEST FOR WMM

Client : Assistant Executive Engineer, Shettyhalli Sub division, BBMP, Bangalore.

Agency : Sri R Shivaram, Contractor, Bangalore.

Name of Work : Augmentation of Water Supply through Borewells Network of Pipelines and ground water Recharges facilities in areas layouts of Shettyhalli village, Abbigere Village & Chikkasandra Village in W.No.12, BBMP, Bangalore.

IS Code: : IS 2720(Part 5):1985

Date of Testing : 31.10.2022 TO 02.11.2022

Material Type : Wet Mix Macadam

Sl. No.	Particulars	Test Results	Requirement as per MORTH 5th edition Cl.406.2.1.2
1	Liquid Limit	20.50	-
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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K. Sreejith

ಕರ್ನಾಟಕ ಸಾರ್ವಜನಿಕ ಕಾರ್ಯದರ್ಶಿ
ಶಿಬಿರ ಸಂಸ್ಥೆ
ಬೆಂಗಳೂರು, ಕರ್ನಾಟಕ

For CIVIL AIM CONSULTANTS & ENGINEERS
Rajal
Authorised Signatory

TEST RESULTS OF AGGREGATE SHAPE TEST (Flakiness & Elongation)

Client : Assistant Executive Engineer, Shettyhalli Sub division, BBMP, Bangalore.

Agency : Sri R Shivaram, Contractor, Bangalore.

Name of work : Augmentation of Water Supply through Borewells Network of Pipelines and ground water Recharges facilities in areas layouts of Shettyhalli village, Abbigere Village & Chikkasandra Village in W.No.12, BBMP, Bangalore.

BIS Code : IS 2386 Part (1):1963

Date of Test : 08.11.2022

Type of Mix : Dense Graded Bituminous Macadam

Sl.No.	Flakiness Index Value(%)	Elongation Index Value(%)	Total(Combined Flakiness and Elongation)(%)	Requirements
1	12.40	13.20	25.60	Maximum allowable Combined Flakiness and Elongation Indices for Dense Graded Bituminous Macadam is 35% as per Table 500.8 MORTH Specification.
2	12.60	13.00	25.60	

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K. Sreejith

K. Sreejith
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ಶಿಬಿರ ಸಮಿತಿ
ಹಿರಿಯ. ಬೆಂಗಳೂರು

For CIVIL AIM CONSULTANTS & ENGINEERS

Rajal
Authorised Signatory

Job No.: CACE /BBMP/RS/W.No.12/2022-23

Date: 08.11.2022

Aggregate Gradation Test

Client	: Assistant Executive Engineer, Shettyhalli Sub division, BBMP, Bangalore.
Agency	: Sri R Shivaram, Contractor ,Bangalore.
Name of the Work	: Augmentation of Water Supply through Borewells Network of Pipelines and ground water Recharges facilities in areas layouts of Shettyhalli village, Abbigere Village & Chikkasandra Village in W.No.12, BBMP, Bangalore.
BIS Code	IS 2386(Part 1):1963(RA 2011)
Sample I / D	Hot mix Plant, Bangalore.
Type of Mix	Dense Graded Bituminous Macadam
Date of Testing	08.11.2022

Total Weight of Sample: 10000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.10	Remarks
37.50	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
26.50	611	6.1	6.11	93.89	90 - 100	
19.00	1247	12.5	18.58	81.42	71 - 95	
13.20	1398	14.0	32.56	67.44	56 - 80	
4.75	2402	24.0	56.58	43.42	38 - 54	
2.36	1083	10.8	67.41	32.59	28 - 42	
0.300	1317	13.2	80.58	19.42	7 - 21	
0.075	1192	11.9	92.50	7.50	2 - 8	

Total Weight of Sample: 10000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.10	Remarks
37.5	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
26.5	748	7.5	7.48	92.52	90 - 100	
19	1421	14.2	21.69	78.31	71 - 95	
13.2	1195	12.0	33.64	66.36	56 - 80	
4.75	2408	24.1	57.72	42.28	38 - 54	
2.360	1101	11.0	68.73	31.27	28 - 42	
0.300	1405	14.1	82.78	17.22	7 - 21	
0.075	1107	11.1	93.85	6.15	2 - 8	

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No. 01, Satvika Nilaya, Opp. Widia Poorna Prajna School,
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JobNo: CACE /BBMP/RS/W.No.12/2022-23

Date : 08.11.2022

TEST RESULTS OF AGGREGATE IMPACT VALUE

Client : Assistant Executive Engineer, Shettyhalli Sub division, BBMP, Bangalore.

Agency : Sri R Shivaram, Contractor, Bangalore.

Name of work : Augmentation of Water Supply through Borewells Network of Pipelines and ground water Recharges facilities in areas layouts of Shettyhalli village, Abbigerre Village & Chikkasandra Village in W.No.12, BBMP, Bangalore.

Source / Location : Hot Mix Plant, Bangalore

BIS Code : IS 2386 Part (4):1963

Type of Mix : Dense Graded Bituminous Macadam

Date of test : 08.11.2022

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W1 g	380	383	
2	Weight of aggregate passing 2.36 mm sieve after the test = W2 g	85	83	
3	Weight of aggregate retained 2.36 mm sieve after the test = W3 g	296	300	
5	Aggregate Impact value = percent fines	22.24	21.67	21.95
	100* (W2/W1) percent			

Comments:

→ Maximum allowable Aggregate Impact value for Dense Graded Bituminous Macadam is 27% (Table 500-8 of MORTH specification)

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Authorised Signatory

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Job No: CACE /BBMP/RS/W.No.12/2022-23

Date: 08.11.2022

TEST REPORT ON PAVING BITUMEN

Client	Assistant Executive Engineer, Shettyhalli Sub division, BBMP, Bangalore.
Agency	Sri R Shivaram, Contractor ,Bangalore.
Name of work	Augmentation of Water Supply through Borewells Network of Pipelines and ground water Recharges facilities in areas layouts of Shettyhalli village, Abbigere Village & Chikkasandra Village in W.No.12, BBMP, Bangalore.
BIS Code	IS 73:2013, IS 1203:1978, IS 1208:1978, IS 1205:1978, IS1448(P-69):1969
Date of Testing	08.11.2022
Type of Mix	Dense Graded Bituminous Macadam , VG 30
Source of Location	Hot Mix Plant

The results of the tests conducted on the bitumen sample using for Dense Graded Bituminous Macadam

Sl.No	Description	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 0C, 100gms, 5sec, 1/10 mm	57	Min 45
2	Softening point, 0C	52	Min 47
3	Ductility at 250C, cm	>102	Min40
4	Flash Point, 0C	270	Min 220

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ಹಿರಿಯ, ಬೆಂಗಳೂರು

For CIVIL AIM CONSULTANTS & ENGINEERS

Prof. Sreejith

Authorised Signatory



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Job No.: CACE /BBMP/RS/W.No.12/2022-23

Date: 10.11.2022

Specific Gravity And Water Absorption Test

Client	: Assistant Executive Engineer, Shettyhalli Sub division, BBMP, Bangalore.
Agency	: Sri R Shivaram, Contractor, Bangalore.
Name of the Work	: Augmentation of Water Supply through Borewells Network of Pipelines and ground water Recharges facilities in areas layouts of Shettyhalli village, Abbigere Village & Chikkasandra Village in W.No.12, BBMP, Bangalore.
BIS Code	IS 2386(Part 3):1963
Type of Mix	Dense Graded Bituminous Macadam
Date of Testing	08.11.2022 to 10.11.2022

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	$W_1 g$	2024	2026	2028	
2	Weight of basket suspended in water	$W_2 g$	757	758	759	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s g$	1267	1268	1269	
4	Weight of saturated surface dry aggregate in air	$W_3 g$	2017	2018	2018	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_s) g$	750	750	749	
6	Weight of oven dried aggregate	$W_4 g$	2007	2007	2005	
7	Specific Gravity	$W_4 / (W_3 - W_s)$	2.676	2.676	2.677	2.676
8	Apparent Specific gravity	$W_4 / (W_4 - W_s)$	2.712	2.716	2.724	2.717
9	Water Absorption	$((W_3 - W_4) * 100) / W_4$	0.50%	0.55%	0.65%	0.56%

Comments:

→ Maximum allowable Aggregate Water absorption value for Dense Graded Bituminous Macadam is 2.0% (As per MORTH table 500.8)

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Job No.: CACE /BBMP/RS/W.No.12/2022-23

Date: 14.11.2022

TEST REPORT ON STABILITY OF MIX

Client	:	Assistant Executive Engineer, Shettyhalli Sub division, BBMP, Bangalore.
Agency	:	Sri R Shivaram, Contractor ,Bangalore.
Name of the Work	:	Augmentation of Water Supply through Borewells Network of Pipelines and ground water Recharges facilities in areas layouts of Shettyhalli village, Abbigere Village & Chikkasandra Village in W.No.12, BBMP, Bangalore.
Type of Mix	:	Dense Graded Bituminous Macadam
Date of Testing	:	14.11.2022

The results of the tests conducted on the Dense Graded Bituminous Macadam mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.38	10.22	9 Kn (min)
2	Marshal flow, mm	2.71	3.73	2 – 4
3	Percent air voids in Mineral Aggregate	13.69	14.49	13 – 15
4	Voids in Compacted Mix	3.22	4.39	3 – 6
5	Percent Voids filled with Bitumen	68.91	71.17	65 - 75
6	Density, g/cc	2.23	2.25	--

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Signature

Signature

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ಬೆಂಗಳೂರು ಉಪವಿಭಾಗ
ಜಿಲ್ಲಾ ಮಂಡಳಿ, ಬೆಂಗಳೂರು

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Authorised Signatory

Job No.: CACE /BBMP/RS/W.No.12/2022-23

Date: 14.11.2022

**BITUMEN CONTENT AND GRADATION DETERMINATION OF DENSE GRADED BITUMINOUS MACADAM MIX
AASHTO T 164 & AASHTO T 30**

Client	: Assistant Executive Engineer, Shettyhalli Sub division, BBMP, Bangalore.
Agency	: Sri R Shivaram, Contractor ,Bangalore.
Name of the Work	: Augmentation of Water Supply through Borewells Network of Pipelines and ground water Recharges facilities in areas layouts of Shettyhalli village, Abbigere Village & Chikkasandra Village in W.No.12, BBMP, Bangalore.
Date of Testing	14.11.2022

BITUMEN CONTENT DETERMINATION

Description	Test 1	Test 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	477.5	476
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	22.50	24.00
7. Bitumen content in %	4.50	4.80
8. Average	4.65	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	42.8	42.8	9.0	91.0	90 - 100
19	74.5	117.3	24.6	75.4	71 - 95
13.2	64.1	181.4	38.0	62.0	56 - 80
4.75	89.2	270.6	56.7	43.3	38 - 54
2.360	64.7	335.3	70.2	29.8	28 - 42
0.300	99.8	435.1	91.1	8.9	7 - 21
0.075	21.1	456.2	95.5	4.5	2 - 8

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	38.1	38.1	8.0	92.0	90 - 100
19	78.5	116.6	24.5	75.5	71 - 95
13.2	64.1	180.7	38.0	62.0	56 - 80
4.75	81.20	261.9	55.0	45.0	38 - 54
2.360	74.7	336.6	70.7	29.3	28 - 42
0.300	96.4	433	91.0	9.0	7 - 21
0.075	22.7	455.7	95.7	4.3	2 - 8

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Job No.: CACE /BBMP/RS/W.No.12/2022-23

Date: 09.11.2022

Aggregate Impact Value

Client	Assistant Executive Engineer, Shettyhalli Sub division, BBMP, Bangalore.
Agency	Sri R Shivaram, Contractor ,Bangalore.
Name of the Work	Augmentation of Water Supply throught Borewells Network of Pipelines and ground water Recharges facilities in areas layouts of Shettyhalli village, Abbigere Village & Chikkasandra Village in W.No.12, BBMP, Bangalore.
BIS Code	IS 2386(Part 4):1963
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	09.11.2022

Sl No.	Details	Test No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	387	384	
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	85	83.5	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	300.5	
4	Aggregate Impact value = percent fines	21.96	21.74	21.85
	$100 * (W_2/W_1)$ percent			

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%(MORTH table no.500.16)

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For CIVIL AIM CONSULTANTS & ENGINEERS

(Signature)

Authorised Signatory

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Job No.: CACE /BBMP/RS/W.No.12/2022-23

Date : 09.11.2022

Aggregate Gradation Test

IS : 2386 Part I

Client	Assistant Executive Engineer, Shettyhalli Sub division, BBMP, Bangalore.
Agency	Sri R Shivaram, Contractor ,Bangalore.
Name of the Work	Augmentation of Water Supply throught Borewells Network of Pipelines and ground water Recharges facilities in areas layouts of Shettyhalli village, Abbigere Village & Chikkasandra Village in W.No.12, BBMP, Bangalore.
BIS Code	IS 2386(Part 1):1963
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	09.11.2022

Total Weight of Sample: 5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	497	9.94	9.94	90.06	90 - 100	
9.5	511	10.22	20.16	79.84	70 - 88	
4.75	664	13.28	33.44	66.56	53 - 71	
2.36	721	14.42	47.86	52.14	42 - 58	
1.18	552	11.04	58.90	41.10	34 - 48	
0.600	608	12.16	71.06	28.94	26 - 38	
0.300	521	10.42	81.48	18.52	18 - 28	
0.150	308	6.16	87.64	12.36	12 - 20	
0.075	401	8.02	95.66	4.34	4 - 10	

Total Weight of Sample: 5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	459	9.18	9.18	90.82	90 - 100	
9.5	587	11.74	20.92	79.08	70 - 88	
4.75	685	13.70	34.62	65.38	53 - 71	
2.36	551	11.02	45.64	54.36	42 - 58	
1.18	581	11.62	57.26	42.74	34 - 48	
0.600	597	11.94	69.20	30.80	26 - 38	
0.300	669	13.38	82.58	17.42	18 - 28	
0.150	205	4.10	86.68	13.32	12 - 20	
0.075	449	8.98	95.66	4.34	4 - 10	

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Date: 09.11.2022

TEST REPORT

Client	:	Assistant Executive Engineer, Shettyhalli Sub division, BBMP, Bangalore.
Agency	:	Sri R Shivaram, Contractor ,Bangalore.
Name of the work	:	Augmentation of Water Supply through Borewells Network of Pipelines and ground water Recharges facilities in areas layouts of Shettyhalli village, Abbigere Village & Chikkasandra Village in W.No.12, BBMP, Bangalore.
IS Code	:	IS 73:2013, IS 1203:1978(RA 2008), IS 1205:1978(RA 2009), IS 1208:1978(RA 2009), IS 1209:1978(RA 2009)
Source of location	:	Hot mix Plant, Bangalore, VG 30
Date of testing	:	09.11.2022

The results of the tests conducted on the bitumen sample using for Bituminous Concrete

Sl. No	Description	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 °C, 1/10 mm	61	Min 45
2	Softening point, °C	54	Min. 47
3	Ductility at 27°C, cm	> 105	Min. 40
4	Flash Point, °C	265	Min. 220

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ಶಿಬಿರಕ್ಕೆ ಉಪವಿಭಾಗ
ಜಿಲ್ಲಾ ಮಂಡಳಿ, ಬೆಂಗಳೂರು

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Job No.: CACE /BBMP/RS/W.No.12/2022-23

Date : 09.11.2022

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	Assistant Executive Engineer, Shettyhalli Sub division, BBMP, Bangalore.
Agency	Sri R Shivaram, Contractor ,Bangalore.
Name of Work	Augmentation of Water Supply through Borewells Network of Pipelines and ground water Recharges facilities in areas layouts of Shettyhalli village, Abbigere Village & Chikkasandra Village in W.No.12, BBMP, Bangalore.
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Bituminous Concrete
Date of Testing	09.11.2022

Sl no	Test	1	2	Requirements as per MORTH 5th edition table no 500.16
1	Flakiness Index	12.7	13.3	Combined Flakiness & Elongation index Max 35%
2	Elongation Index	13.1	12.9	
	Combined Flakiness & Elongation index	25.80	26.20	

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Job No.: CACE /BBMP/RS/W.No.12/2022-23

Date : 11.11.2022

Specific Gravity And Water Absorption Test

Client	Assistant Executive Engineer, Shettyhalli Sub division, BBMP, Bangalore.
Agency	Sri R Shivaram, Contractor ,Bangalore.
Name of the Work	Augmentation of Water Supply through Borewells Network of Pipelines and ground water Recharges facilities in areas layouts of Shettyhalli village, Abbigeri Village & Chikkasandra Village in W.No.12, BBMP, Bangalore.
BIS Code	IS 2386(Part 3):1963
Type of Mix	Bituminous Concrete
Date of Testing	09.11.2022 to 11.11.2022

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	$W_1 g$	2025	2024	2026	
2	Weight of basket suspended in water	$W_2 g$	753	755	756	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s g$	1272	1269	1270	
4	Weight of saturated surface dry aggregate in air	$W_3 g$	2023	2022	2025	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_s) g$	751	753	755	
6	Weight of oven dried aggregate	$W_4 g$	2010	2011	2012	
7	Specific Gravity	$W_4 / (W_3 - W_s)$	2.676	2.671	2.665	2.671
8	Apparent Specific gravity	$W_4 / (W_4 - W_s)$	2.724	2.710	2.712	2.715
9	Water Absorption	$((W_3 - W_4) * 100) / W_4$	0.65%	0.55%	0.65%	0.61%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%(MORTH table 500.16)

Note:

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→ The results indicated above are based on the tests carried out on the samples collected at the site.

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Job No.: CACE /BBMP/RS/W.No.12/2022-23

Date: 14.11.2022

TEST REPORT ON STABILITY OF MIX

Client	: Assistant Executive Engineer, Shettyhalli Sub division, BBMP, Bangalore.
Agency	: Sri R Shivaram, Contractor ,Bangalore.
Name of the Work	: Augmentation of Water Supply through Borewells Network of Pipelines and ground water Recharges facilities in areas layouts of Shettyhalli village, Abbigere Village & Chikkasandra Village in W.No.12, BBMP, Bangalore.
Source of location	: Hot mix Plant, Bangalore
Type of Mix	: Bituminous Concrete
Date of Testing	: 14.11.2022

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.48	9.31	9 Kn (min)
2	Marshal flow, mm	3.39	2.77	2 - 4
3	Percent air voids in Mineral Aggregate	13.27	14.12	13 - 15
4	Voids in Compacted Mix	3.33	4.41	3 - 6
5	Percent Voids filled with Bitumen	69.77	71.95	65 - 75
6	Density, g/cc	2.23	2.25	--

Note:

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K. Srinivas

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Job No.: CACE /BBMP/RS/W.No.12/2022-23

Date : 14.11.2022

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	Assistant Executive Engineer, Shettyhalli Sub division, BBMP, Bangalore.
AGENCY	Sri R Shivaram, Contractor ,Bangalore.
NAME OF THE WORK	Augmentation of Water Supply through Borewells Network of Pipelines and ground water Recharges facilities in areas layouts of Shettyhalli village, Abbigere Village & Chikkasandra Village in W.No.12, BBMP, Bangalore.
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	14.11.2022

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	472.5	472.5
3. Weight of Asphalt and Mineral matter Extracted, g	27.5	27.5
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	27.5	27.5
7. Bitumen content in %	5.50	5.50
8. Average	5.50	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	19.1	19.1	4.0	96.0	90 - 100
9.5	67.8	86.9	18.4	81.6	70 - 88
4.75	90.7	177.6	37.6	62.4	53 - 71
2.36	45.1	222.7	47.1	52.9	42 - 58
1.18	36.3	259	54.8	45.2	34 - 48
0.600	55.2	314.2	66.5	33.5	26 - 38
0.300	42.9	357.1	75.6	24.4	18 - 28
0.150	36.2	393.3	83.2	16.8	12 - 20
0.075	40.9	434.2	91.9	8.1	4 - 10

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.17
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	17.7	17.7	3.7	96.3	90 - 100
9.5	67.3	85	18.0	82.0	70 - 88
4.75	93.2	178.2	37.7	62.3	53 - 71
2.36	46.7	224.9	47.6	52.4	42 - 58
1.18	49.8	274.7	58.1	41.9	34 - 48
0.600	55.1	329.8	69.8	30.2	26 - 38
0.300	48.2	378	80.0	20.0	18 - 28
0.150	36.1	414.1	87.6	12.4	12 - 20
0.075	32.6	446.7	94.5	5.5	4 - 10

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